

**WHAT IS CLAIMED IS:**

1. An ink jet ink composition comprising water, a humectant, and a hyperbranched polymeric dye comprising a hyperbranched polymer having a dye chromophore pendant on the polymer chain or incorporated into the polymer backbone.

2. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore pendant on the polymer chain has the formula:



wherein:

HB is a hyperbranched polymer core;  
D is a dye moiety; and  
n is an integer of at least 2.

3. The composition of Claim 2 wherein said HB is a polyamide, polyester, polyether, vinylic polymer, polyimine, polysiloxane, polyesteramide or polyurethane.

4. The composition of Claim 2 wherein said HB is prepared by a chain polymerization of a monomer of the formula  $\text{M}^1\text{-R}^1\text{-M}^2_m$  wherein (i)  $\text{R}^1$  is a linear or branched alkyl, carbonyl, or aromatic moiety; (ii),  $\text{M}^1$  and  $\text{M}^2$  are reactive groups that react independently of each other in which  $\text{M}^1$  is a polymerization group and  $\text{M}^2$  is a precursor of a moiety  $\text{M}^{2*}$  which initiates the polymerization of  $\text{M}^1$  as a result of being activated; and (iii), m is an integer of at least 1.

5. The composition of Claim 2 wherein said HB is prepared by a condensation or addition polymerization of a monomer of the formula  $\text{M}^3\text{-R}^2\text{-M}^4_p$  wherein (i)  $\text{R}^2$  is a linear or branched alkyl or aromatic moiety; (ii),  $\text{M}^3$  and  $\text{M}^4$  are

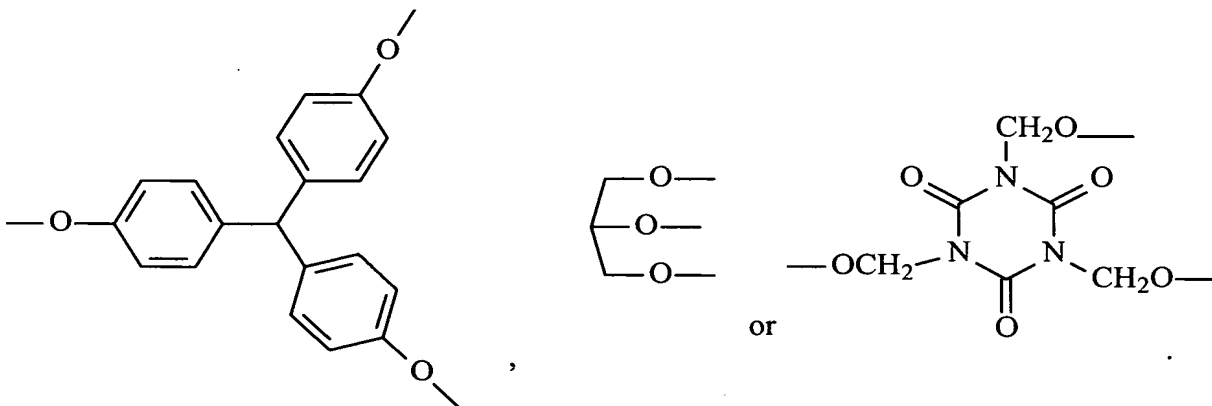
groups that undergo a condensation or addition reaction; and (iii), p is an integer of at least 2.

6. The composition of Claim 2 wherein said HB is prepared by a  
5 condensation or addition polymerization of a monomer of the formula  $R^2-M^5_q$  and  $R^3-M^6_t$ , wherein (i)  $R^2$  is as defined above and  $R^3$  is a linear or branched alkyl or aromatic moiety; (ii),  $M^5$  and  $M^6$  are groups that undergo a condensation or addition reaction; and (iii), q is an integer of at least 2 and t an integer of at least 3.

7. The composition of Claim 4 wherein  $M^1$  is a non-substituted or  
10 substituted vinylic group,  $M^2$  is X,  $-CH_2X$  or  $-CH(CH_3)X$  wherein X is Cl, Br, I, S-C(=S),  $YR^4R^5$  or  $-O-NR^4R^5$ , Y=O or N, and  $R^4$  and  $R^5$  are each independently  $-(CH_2)_r$  (r = 1-12),  $-C_6H_5$ ,  $-C(O)O$ , or C(O).

8. The composition of Claim 5 wherein  $M^3$  and  $M^4$  are each  
15 independently  $-COOH$ ,  $-OH$ ,  $-C(O)Cl$ , epoxy, anhydride, NH, or  $NH_2$ , and  $R^2$  is  $-C_6H_3-$ , or  $-(CH_2)_s-C(R^6)-$  wherein  $R^6$  is a linear or branched alkyl or aromatic group and s is an integer of 1-14.

9. The composition of Claim 6 wherein  $M^5$  and  $M^6$  are each  
20 independently  $-COOH$ ,  $-OH$ ,  $-C(O)Cl$ , epoxy, anhydride, NH or  $NH_2$ , and  $R^3$  is  $-C_6H_4-$ ,  $-C_6H_4-O-C_6H_4-$ ,  $-C_6H_3$ ,  $N(CH_2)_3-$ ,  $-C_4H_8-$ ,  $-C_6H_{10}-$ ,



10. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the backbone thereof is a polyamide, polyester, polyether, vinylic polymer, polyimine, polyesteramide or polyurethane.

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11. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the polymer backbone is prepared by a chain polymerization of a monomer of the formula  $M^1-R^7-M^2_m$  wherein  $R^7$  is a linear or branched alkyl, carbonyl, or aromatic moiety containing a dye chromophore and  $M^1$ ,  $M^2$  and  $m$  are defined as in Claim 4.

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12. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the polymer backbone is prepared by a condensation or addition polymerization of a monomer of the formula  $M^3-R^7-M^4_p$  wherein  $R^7$  is defined in Claim 11 and  $M^3$ ,  $M^4$  and  $p$  are defined as in Claim 5.

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13. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the polymer backbone is prepared by a condensation or addition polymerization of a monomer of the formula  $R^8-M^5_q$  and  $R^9-M^6_t$  wherein  $R^8$  and  $R^9$  are each independently a linear or branched alkyl or aromatic moiety, at least one of which contains a dye chromophore, and  $M^5$ ,  $M^6$ ,  $q$  and  $t$  are defined as in Claim 6.

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14. The composition of Claim 1 wherein said dye chromophore is a mono- or poly-azo dye, basic dye, phthalocyanine dye, methine or polymethine dye, merocyanine dye, azamethine dye, quinophthalone dye, thiazine dye, oxazine dye, anthraquinone or metal-complex dye.

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15. The composition of Claim 14 wherein said mono- or poly-azo dye is a pyrazoleazoindole.

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16. The composition of Claim 14 wherein said metal-complex dye is a transition metal complex of an 8-heterocyclazo-5-hydroxyquinoline.

5                    17. The composition of Claim 1 wherein said humectant is diethylene glycol, glycerol or diethylene glycol monobutylether.

10                    18. The composition of Claim 1 wherein said hyperbranched polymeric dye comprises about 0.2 to about 20 % by weight of said ink jet ink composition.